

REMARKS

Status of the Application

- Claims 1-32 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,510,755 to *Higuchi et al.* (“*Higuchi*”), in view of U.S. Patent No. 6,252,705 to *Lo et al.* (“*Lo*”), and in further view of U.S. Patent No. 5,784,925 to *Trost et al.* (“*Trost*”).

Claims 1, 11, 25, 28, and 30

None of *Higuchi*, *Lo*, and *Trost* discloses all elements of the claims as amended. More specifically, none of *Higuchi*, *Lo*, and *Trost* discloses an airbearing structure and work piece/reticle holder each configured to operate while exposed to the same vacuum environment. Each of claims 1, 11, 25, 28, and 30 are therefore patentable over the cited prior art for at least this reason.

Higuchi

Higuchi discloses a stage mechanism 1 with two air slide bearings 5, that operates partially within a vacuum chamber 2 (Col. 8:37-58). The air slide bearings 5 are separated from the vacuum chamber 2 by bellows 6 (Col. 8:65-9:17). In this manner, the stage mechanism 1 operates within the vacuum environment of the vacuum chamber 2, while the air slide bearings 5 operate within a different environment outside the vacuum chamber 2. The fact that the air slide bearings 5 and stage mechanism 1 are exposed to two different environments is highlighted by the presence of the bellows 6, which isolate the bearings 5 from the stage mechanism 1.

It can be seen that the stage mechanism/work piece holder 1 of *Higuchi* operates within a vacuum environment, while the air bearings 5 do not. In contrast, amended claims 1, 11, 25, 28, and 30 recite an airbearing structure and work piece/reticle holder configured to operate while exposed to the same vacuum environment.

Lo

Lo discloses a stage 100 that is propelled along two sets of linear bearing rails 117a-b, 118a-b, by motors 103a-b, respectively (Col. 5:7-23). *Lo* does not disclose airbearing structures for actuating the stage 100. Rather, *Lo* only discloses the actuation of stage 100 by piezoelectric

motors (Col. 5:19-38). Indeed, *Lo* specifically states that airbearing structures are not to be used for actuation: “Stage 100 is made vacuum compatible by using vacuum compatible motors as mentioned above, *and by not using air bearing[s]*” (Col. 9:34-36) (emphasis added).

Accordingly, *Lo* does not disclose air bearing structures, and thus cannot disclose airbearing structures configured to operate while exposed to the same vacuum environment as work piece/reticle holders. *Lo* thus does not disclose all elements of amended claims 1, 11, 25, 28, and 30.

Trost

Trost discloses a vacuum compatible linear motion device 100 that includes a fluid bearing 150 configured to move along a bearing rod 152 (Col. 4:1-20). The fluid bearing 150 and bearing rod 152 are contained within a vacuum enclosure 130 that is sealed off by flexible bellows 132. The entire device 100 is configured to operate within the main vacuum chamber of an electron beam exposure system. More specifically, a payload 700 is attached to the outside of the device 100, where it is exposed to the vacuum environment of the main vacuum chamber (See, e.g., Fig. 7). In this manner, the payload 700 is exposed to a main vacuum chamber having “a first pressure in the range of approximately 1×10^{-5} to 1×10^{-7} torr” while the vacuum enclosure 130 containing the fluid bearing 150 “is maintained at a second pressure, *different from the first pressure*. For example, enclosure 130 is maintained at a pressure in the range of approximately 10 torr to just above the first pressure” (Col. 4:54-64) (emphasis added).

In essence, *Trost* discloses a payload 700 exposed to the first pressure of the main vacuum chamber, and a flexible bellows 132 that maintains a fluid bearing 150 at a second pressure, different from the first pressure. *Trost* does not disclose airbearing structures configured to operate while exposed to the same vacuum environment as work piece/reticle holders. *Trost* thus does not disclose all elements of amended claims 1, 11, 25, 28, and 30.

Claims 2-10, 12-24, 26-27, 29, and 31-32

Claims 2-10, 12-24, 26-27, 29, and 31-32 depend from claims 1, 11, 25, 28, and 30 respectively, and accordingly are patentable for at least the reasons discussed above. These dependent claims also add additional limitations not disclosed in the cited art. For example,

amended claim 18 discloses two airbearing structures, both configured to operate within the same vacuum environment as the work piece holder.

Applicant believes that all pending claims are allowable and respectfully requests a Notice of Allowance for this application from the Examiner. Should the Examiner believe that a telephone conference would expedite the prosecution of this application, the undersigned can be reached at (650) 314-5322.

Respectfully submitted,
BEYER WEAVER & THOMAS, LLP

A handwritten signature in black ink, appearing to read 'Jon Y. Ikegami', written in a cursive style.

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